



EXPRESS MAIL NO. EL897874831US

1

SEQUENCE LISTING

<110> Goshorn, Stephen C.
Graves, Scott Stoll
Schultz, Joanne Elaine
Lin, Yakang
Sanderson, James A.
Reno, Jonh M.

<120> STREPTAVIDIN EXPRESSED GENE FUSIONS AND
METHODS OF USE THEREOF

<130> 690022.547

<140> US 09/589,870

<141> 2000-06-05

<160> 47

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 638

<212> DNA

<213> Streptomyces avidinii

<400> 1

ccctccgtcc	ccgccgggca	acaactaggg	agtatttttc	gtgtctcaca	tgcgcaagat	60
cgtcgttgca	gccatcgccg	tttccctgac	cacgggtctcg	attacggcca	gcgcttcggc	120
agaccctcc	aaggactcga	aggcccaggt	ctcggccgcc	gaggccggca	tcaccggcac	180
ctggtacaac	cagctcggct	cgaccttcac	cgtgaccgcg	ggcgccgacg	gcgccctgac	240
cggaacctac	gagtcggccg	tcggcaacgc	cgagagccgc	tacgtcctga	ccggtcgtta	300
cgacagcgcc	ccggccaccg	acggcagcgg	caccgccctc	ggttggaagg	tggcctggaa	360
gaataactac	cgcaacgccc	actccgcgac	cacgtggagc	ggccagtacg	tcggcgggcg	420
cgaggcgagg	atcaacaccc	agtggctgct	gacctccggc	accaccgagg	ccaacgcctg	480
gaagtccacg	ctggtcggcc	acgacacctt	caccaaggtg	aagccgtccg	ccgcctccat	540
cgacgcggcg	aagaaggccg	gcgtcaacaa	cggcaaccgc	ctcgacgccg	ttcagcagta	600
gtcgcgtccc	ggcaccggcg	ggtgccggga	cctcggcc			638

<210> 2

<211> 183

<212> PRT

<213> Streptomyces avidinii

<400> 2

Met	Arg	Lys	Ile	Val	Val	Ala	Ala	Ile	Ala	Val	Ser	Leu	Thr	Thr	Val
1				5					10					15	
Ser	Ile	Thr	Ala	Ser	Ala	Ser	Ala	Asp	Pro	Ser	Lys	Asp	Ser	Lys	Ala
			20					25					30		
Gln	Val	Ser	Ala	Ala	Glu	Ala	Gly	Ile	Thr	Gly	Thr	Trp	Tyr	Asn	Gln
			35				40					45			
Leu	Gly	Ser	Thr	Phe	Ile	Val	Thr	Ala	Gly	Ala	Asp	Gly	Ala	Leu	Thr

RECEIVED
DEC 13 2001
TECH CENTER 1600/2300

50		55		60
Gly Thr Tyr Glu Ser Ala Val Gly Asn Ala Glu Ser Arg Tyr Val Leu				
65		70		75
Thr Gly Arg Tyr Asp Ser Ala Pro Ala Thr Asp Gly Ser Gly Thr Ala				
	85		90	
Leu Gly Trp Thr Val Ala Trp Lys Asn Asn Tyr Arg Asn Ala His Ser				
	100		105	110
Ala Thr Thr Trp Ser Gly Gln Tyr Val Gly Gly Ala Glu Ala Arg Ile				
	115		120	125
Asn Thr Gln Trp Leu Leu Thr Ser Gly Thr Thr Glu Ala Asn Ala Trp				
	130		135	140
Lys Ser Thr Leu Val Gly His Asp Thr Phe Thr Lys Val Lys Pro Ser				
145		150		155
Ala Ala Ser Ile Asp Ala Ala Lys Lys Ala Gly Val Asn Asn Gly Asn				
	165		170	175
Pro Leu Asp Ala Val Gln Gln				
	180			

<210> 3

<211> 1612

<212> DNA

<213> *Streptomyces avidinii*

<400> 3

gaattcacga	agtaaccgac	aggactcggc	cattcttttg	ccgaaattcc	tttgcagaaa	60
atgttggtga	gaaccctccg	atggctagta	cgatttacac	cgaacatgtg	cccttggcaa	120
ccatcgaccc	ggacctcgac	catccagttc	tgccgccaaa	gacacatgcc	gcactgctgt	180
ttgttcaccg	acaccgtcag	gtgcacggcc	gaggtcacaa	accttgacgg	gcgggatacg	240
gacggcgcac	gccacagcgc	gccctccgtc	cccgccgggc	aacaactagg	gagtattttt	300
cgtgtctcac	atgcgcaaga	tcgtcgttgc	agccatcgcc	gtttccctga	ccacggtctc	360
gattacggcc	atggctgaca	tccagatgac	tcagtctcca	tcgtccttgt	ctgcctctgt	420
gggagacaga	gtcacgatca	cttgtcgggc	tagtcagggc	attagaggta	atttagactg	480
gtatcagcag	aaacctggta	agggaccgaa	actcctaata	tactccacat	ccaatttaaa	540
ttctggtgtc	ccatcaaggt	tcagtggcag	tgggtctggg	tcagattata	ctctcaccat	600
cagcagcctt	cagcctgaag	atttcgcaac	gtattactgt	ctacagcgta	atgcgtatcc	660
gtacacgttc	ggacaaggga	ccaagctgga	gatcaagatc	tctggtggcg	gtggctcggg	720
cgggtggtgg	tcgggtggcg	gaggctcgag	ccagggttcag	ctgggtccagt	ctggggcaga	780
ggtgaaaaag	ccaggggcct	cagtcaaggt	gtcctgcaag	gcttctggct	tcaacattaa	840
agacacctat	atgcactggg	tgaggcaggc	acctggacag	ggcctgcagt	ggatgggaag	900
gattgaccta	gcgaatggta	atactaaatc	cgacctgtcc	ttccagggca	gggtgactat	960
aacagcagac	acgtccatca	acacagccta	catggaactc	agcagcctga	ggtctgacga	1020
cactgccgtc	tattactgtt	ctagagaggt	cctaactggg	acgtgggtctt	tggactactg	1080
gggtcaagga	accttagtca	ccgtgagctc	tggctctggt	tcggcagacc	cctccaagga	1140
ctcgaaggcc	caggtctcgg	ccgccgaggc	cggcacacc	ggcacctggg	acaaccagct	1200
cggctcgacc	ttcatcgtga	ccgcgggcgc	cgacggcgcc	ctgaccggaa	cctacgagtc	1260
ggccgtcggc	aacgccgaga	gccgctacgt	cctgaccggg	cgttacgaca	gcgccccggc	1320
caccgacggc	agcggcaccg	ccctcggttg	gacgggtggc	tggaagaata	actaccgcaa	1380
cgcccactcc	gcgaccacgt	ggagcggcca	gtacgtcggc	ggcgccgagg	cgaggatcaa	1440
caccagtggt	ctgctgacct	ccggcaccac	cgaggccaac	gcctggaagt	ccacgctggg	1500
cggccacgac	accttcacca	aggtgaagcc	gtccgccggc	tccatcgacg	cggcgaagaa	1560
ggccggcgct	aacaacggca	accgcgtcga	cgccgttcag	cagtaaggat	cc	1612

<210> 4

<211> 431

<212> PRT

<213> Streptomyces avidinii

<400> 4

Met	Arg	Lys	Ile	Val	Val	Ala	Ala	Ile	Ala	Val	Ser	Leu	Thr	Thr	Val
1				5					10					15	
Ser	Ile	Thr	Ala	Met	Ala	Asp	Ile	Gln	Met	Thr	Gln	Ser	Pro	Ser	Ser
			20					25					30		
Leu	Ser	Ala	Ser	Val	Gly	Asp	Arg	Val	Thr	Ile	Thr	Cys	Arg	Ala	Ser
		35					40					45			
Gln	Gly	Ile	Arg	Gly	Asn	Leu	Asp	Trp	Tyr	Gln	Gln	Lys	Pro	Gly	Lys
	50					55					60				
Gly	Pro	Lys	Leu	Leu	Ile	Tyr	Ser	Thr	Ser	Asn	Leu	Asn	Ser	Gly	Val
65					70					75					80
Pro	Ser	Arg	Phe	Ser	Gly	Ser	Gly	Ser	Gly	Ser	Asp	Tyr	Thr	Leu	Thr
				85					90					95	
Ile	Ser	Ser	Leu	Gln	Pro	Glu	Asp	Phe	Ala	Thr	Tyr	Tyr	Cys	Leu	Gln
			100					105					110		
Arg	Asn	Ala	Tyr	Pro	Tyr	Thr	Phe	Gly	Gln	Gly	Thr	Lys	Leu	Glu	Ile
		115					120					125			
Lys	Ile	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly
	130					135					140				
Gly	Ser	Ser	Gln	Val	Gln	Leu	Val	Gln	Ser	Gly	Ala	Glu	Val	Lys	Lys
145					150					155					160
Pro	Gly	Ala	Ser	Val	Lys	Val	Ser	Cys	Lys	Ala	Ser	Gly	Phe	Asn	Ile
				165					170					175	
Lys	Asp	Thr	Tyr	Met	His	Trp	Val	Arg	Gln	Ala	Pro	Gly	Gln	Gly	Leu
		180						185					190		
Gln	Trp	Met	Gly	Arg	Ile	Asp	Pro	Ala	Asn	Gly	Asn	Thr	Lys	Ser	Asp
		195					200					205			
Leu	Ser	Phe	Gln	Gly	Arg	Val	Thr	Ile	Thr	Ala	Asp	Thr	Ser	Ile	Asn
	210					215					220				
Thr	Ala	Tyr	Met	Glu	Leu	Ser	Ser	Leu	Arg	Ser	Asp	Asp	Thr	Ala	Val
225					230					235					240
Tyr	Tyr	Cys	Ser	Arg	Glu	Val	Leu	Thr	Gly	Thr	Trp	Ser	Leu	Asp	Tyr
				245					250					255	
Trp	Gly	Gln	Gly	Thr	Leu	Val	Thr	Val	Ser	Ser	Gly	Ser	Gly	Ser	Ala
			260					265					270		
Asp	Pro	Ser	Lys	Asp	Ser	Lys	Ala	Gln	Val	Ser	Ala	Ala	Glu	Ala	Gly
		275					280					285			
Ile	Thr	Gly	Thr	Trp	Tyr	Asn	Gln	Leu	Gly	Ser	Thr	Phe	Ile	Val	Thr
	290					295					300				
Ala	Gly	Ala	Asp	Gly	Ala	Leu	Thr	Gly	Thr	Tyr	Glu	Ser	Ala	Val	Gly
305					310					315					320
Asn	Ala	Glu	Ser	Arg	Tyr	Val	Leu	Thr	Gly	Arg	Tyr	Asp	Ser	Ala	Pro
				325					330					335	
Ala	Thr	Asp	Gly	Ser	Gly	Thr	Ala	Leu	Gly	Trp	Thr	Val	Ala	Trp	Lys
			340					345					350		
Asn	Asn	Tyr	Arg	Asn	Ala	His	Ser	Ala	Thr	Thr	Trp	Ser	Gly	Gln	Tyr
		355					360					365			
Val	Gly	Gly	Ala	Glu	Ala	Arg	Ile	Asn	Thr	Gln	Trp	Leu	Leu	Thr	Ser
	370					375					380				
Gly	Thr	Thr	Glu	Ala	Asn	Ala	Trp	Lys	Ser	Thr	Leu	Val	Gly	His	Asp
385					390					395					400

Thr Phe Thr Lys Val Lys Pro Ser Ala Ala Ser Ile Asp Ala Ala Lys
 405 410 415
 Lys Ala Gly Val Asn Asn Gly Asn Pro Leu Asp Ala Val Gln Gln
 420 425 430

<210> 5

<211> 1239

<212> DNA

<213> Streptomyces avidinii

<400> 5

```

gacatcgtgc tgtcgcagtc tccagcaatc ctgtctgcat ctccagggga gaaggtcaca      60
atgacttgca gggccagctc aagtgttaagt tacatgcact ggtaccagca gaagccagga      120
tcctccccc aaccctggat ttatgccaca tccaacctgg cttctggagt ccctgctcgc      180
ttcagtgga gtgggtctgg gacctcttac tctctcaca tcagcagagt ggaggctgaa      240
gatgctgcca cttattactg ccagcagtggt attagtaacc caccacggtt cggtgctggg      300
accaagctgg agctgaagat ctctggtctg gaaggcagcc cggaagcagg tctgtctccg      360
gacgcaggtt ccggctcgag ccaggttcag ctgggtccagt caggggctga gctggtgaag      420
cctggggcct cagtgaagat gtcttgcaag gcttctggct acacatttac cagttacaat      480
atgcactggg taaagcagac acctggacag ggcctggaat ggattggagc tatttatcca      540
ggaaatggtg atacttccta caatcagaag ttcaaaggca aggccacatt gactgcagac      600
aaatcctcca gcacagccta catgcagctc agcagcctga catctgagga ctctgcggtc      660
tattactgtg caagagcgca attacgacct aactactggt acttcgatgt ctggggcgca      720
gggaccacgg tcaccgtgag ctctggctct gggtcggcag acccctccaa ggactcgaag      780
gccaggtct cggccgccga ggccggcatc accggcacct ggtacaacca gtcgggctcg      840
accttcacg tgaccgcggg cgccgacggc gccctgaccg gaacctacga gtcggccgtc      900
ggcaacgccg agagccgcta cgtcctgacc ggtcgttacg acagcgcccc ggccaccgac      960
ggcagcggca ccgcccctcg ttggacggtg gcctggaaga ataactaccg caacgcccac     1020
tcgcgacca cgtggagcgg ccagtacgtc ggcggcgcgg aggcgaggat caacaccag      1080
tggtgctga cctccggcac caccgaggcc aacgcctgga agtccacgct ggtcggccac      1140
gacaccttca ccaaggtgaa gccgtccgcc gcctccatcg acgcggcgaa gaaggccggc      1200
gtcaacaacg gcaaccgct cgacgccgtt cagcagtaa      1239

```

<210> 6

<211> 412

<212> PRT

<213> Streptomyces avidinii

<400> 6

```

Asp Ile Val Leu Ser Gln Ser Pro Ala Ile Leu Ser Ala Ser Pro Gly
 1           5           10           15
Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Ser Tyr Met
          20           25           30
His Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Lys Pro Trp Ile Tyr
          35           40           45
Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser
          50           55           60
Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Val Glu Ala Glu
65           70           75           80
Asp Ala Ala Thr Tyr Cys Gln Gln Trp Ile Ser Asn Pro Pro Thr
          85           90           95
Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Ile Ser Gly Leu Glu Gly
          100          105          110
Ser Pro Glu Ala Gly Leu Ser Pro Asp Ala Gly Ser Gly Ser Ser Gln

```

	115		120		125										
Val	Gln	Leu	Val	Gln	Ser	Gly	Ala	Glu	Leu	Val	Lys	Pro	Gly	Ala	Ser
	130					135					140				
Val	Lys	Met	Ser	Cys	Lys	Ala	Ser	Gly	Tyr	Thr	Phe	Thr	Ser	Tyr	Asn
145					150					155					160
Met	His	Trp	Val	Lys	Gln	Thr	Pro	Gly	Gln	Gly	Leu	Glu	Trp	Ile	Gly
				165					170					175	
Ala	Ile	Tyr	Pro	Gly	Asn	Gly	Asp	Thr	Ser	Tyr	Asn	Gln	Lys	Phe	Lys
			180					185					190		
Gly	Lys	Ala	Thr	Leu	Thr	Ala	Asp	Lys	Ser	Ser	Ser	Thr	Ala	Tyr	Met
	195					200						205			
Gln	Leu	Ser	Ser	Leu	Thr	Ser	Glu	Asp	Ser	Ala	Val	Tyr	Tyr	Cys	Ala
	210					215					220				
Arg	Ala	Gln	Leu	Arg	Pro	Asn	Tyr	Trp	Tyr	Phe	Asp	Val	Trp	Gly	Ala
225					230					235					240
Gly	Thr	Thr	Val	Thr	Val	Ser	Ser	Gly	Ser	Gly	Ser	Ala	Asp	Pro	Ser
			245					250						255	
Lys	Asp	Ser	Lys	Ala	Gln	Val	Ser	Ala	Ala	Glu	Ala	Gly	Ile	Thr	Gly
			260					265					270		
Thr	Trp	Tyr	Asn	Gln	Leu	Gly	Ser	Thr	Phe	Ile	Val	Thr	Ala	Gly	Ala
	275					280						285			
Asp	Gly	Ala	Leu	Thr	Gly	Thr	Tyr	Glu	Ser	Ala	Val	Gly	Asn	Ala	Glu
	290				295						300				
Ser	Arg	Tyr	Val	Leu	Thr	Gly	Arg	Tyr	Asp	Ser	Ala	Pro	Ala	Thr	Asp
305					310					315					320
Gly	Ser	Gly	Thr	Ala	Leu	Gly	Trp	Thr	Val	Ala	Trp	Lys	Asn	Asn	Tyr
			325					330						335	
Arg	Asn	Ala	His	Ser	Ala	Thr	Thr	Trp	Ser	Gly	Gln	Tyr	Val	Gly	Gly
			340					345					350		
Ala	Glu	Ala	Arg	Ile	Asn	Thr	Gln	Trp	Leu	Leu	Thr	Ser	Gly	Thr	Thr
	355					360						365			
Glu	Ala	Asn	Ala	Trp	Lys	Ser	Thr	Leu	Val	Gly	His	Asp	Thr	Phe	Thr
	370				375						380				
Lys	Val	Lys	Pro	Ser	Ala	Ala	Ser	Ile	Asp	Ala	Ala	Lys	Lys	Ala	Gly
385					390					395					400
Val	Asn	Asn	Gly	Asn	Pro	Leu	Asp	Ala	Val	Gln	Gln				
			405						410						

<210> 7

<211> 1280

<212> DNA

<213> Streptomyces avidinii

<400> 7

ccatggctca	ggttcagctg	gtccagtcag	gggctgagct	ggtgaagcct	ggggcctcag	60
tgaagatgtc	ctgcaaggct	tctggctaca	catttaccag	ttacaatatg	cactgggtaa	120
agcagacacc	tggacagggc	ctggaatgga	ttggagctat	ttatccagga	aatggtgata	180
cttcctacaa	tcagaagttc	aaaggcaagg	ccacattgac	tgcagacaaa	tcctccagca	240
cagcctacat	gcagctcagc	agcctgacat	ctgaggactc	tgcggtctat	tactgtgcaa	300
gagcgcaatt	acgacctaac	tactggtact	tcgatgtctg	gggcgcaggg	accacgggtca	360
ccgtgagcaa	gatctctggt	ggcgggtggc	cgggcggtgg	tgggtcgggt	ggcggcggct	420
cgggtggtgg	tgggtcgggc	ggcggcggct	cgagcgacat	cgtgctgtcg	cagtctccag	480
caatcctgtc	tgcattctcca	ggggagaagg	tcacaatgac	ttgcagggcc	agctcaagtg	540
taagttacat	gcactggtac	cagcagaagc	caggatcctc	ccccaaacc	tggatttatg	600

```

ccacatccaa cctggcttct ggagtccctg ctcgcttcag tggcagtggg tctgggacct 660
cttactctct cacaatcagc agagtggagg ctgaagatgc tgccacttat tactgccagc 720
agtggattag taaccacccc acgttcggtg ctgggaccaa gctggagctg aagagctctg 780
gctctgggtc ggagaccccc tccaaggact cgaaggccca ggtctcggcc gccgaggccg 840
gcatcaccgg cacctggtac aaccagctcg gctcgacctt catcgtgacc gcgggcgccg 900
acggcgccct gaccggaacc tacgagtcgg ccgtcggcaa cgccgagagc cgctacgtcc 960
tgaccggtcg ttacgacagc gccccggcca ccgacggcag cgccaccgcc ctcggttgga 1020
cgggtggcctg gaagaataac taccgcaacg cccactccgc gaccacgtgg agcggccaagt 1080
acgtcggcgg cgccgaggcg aggatcaaca cccagtggct gctgacctcc ggcaaccaccg 1140
aggccaacgc ctggaagtcc acgtcggtcg gccacgacac cttcaccaag gtgaagccgt 1200
ccgccgcctc catcgacgcg gcgaagaagg ccggcgctcaa caacggcaac ccgctcgacg 1260
ccgttcagca gtaaggatcc 1280

```

<210> 8

<211> 423

<212> PRT

<213> Streptomyces avidinii

<400> 8

```

Met Ala Gln Val Gln Leu Val Gln Ser Gly Ala Glu Leu Val Lys Pro
 1          5          10          15
Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr
          20          25          30
Ser Tyr Asn Met His Trp Val Lys Gln Thr Pro Gly Gln Gly Leu Glu
          35          40          45
Trp Ile Gly Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr Asn Gln
          50          55          60
Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr
65          70          75          80
Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr
          85          90          95
Tyr Cys Ala Arg Ala Gln Leu Arg Pro Asn Tyr Trp Tyr Phe Asp Val
          100          105          110
Trp Gly Ala Gly Thr Thr Val Thr Val Ser Lys Ile Ser Gly Gly Gly
          115          120          125
Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Gly
          130          135          140
Ser Gly Gly Gly Gly Ser Ser Asp Ile Val Leu Ser Gln Ser Pro Ala
145          150          155          160
Ile Leu Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala
          165          170          175
Ser Ser Ser Val Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Ser
          180          185          190
Ser Pro Lys Pro Trp Ile Tyr Ala Thr Ser Asn Leu Ala Ser Gly Val
          195          200          205
Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr
          210          215          220
Ile Ser Arg Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln
225          230          235          240
Trp Ile Ser Asn Pro Pro Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu
          245          250          255
Lys Ser Ser Gly Ser Gly Ser Ala Asp Pro Ser Lys Asp Ser Lys Ala
          260          265          270
Gln Val Ser Ala Ala Glu Ala Gly Ile Thr Gly Thr Trp Tyr Asn Gln

```

```
<210> 9
<211> 18
<212> PRT
<213> Artificial Sequence
```

<400> 9
Gly Leu Glu Gly Ser Pro Glu Ala Gly Leu Ser Pro Asp Ala Gly Ser
1 5 10 15
Gly Ser

```
<210> 10
<211> 15
<212> PRT
<213> Artificial Sequence
```

<400> 10
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
1 5 10 15

```
<210> 11
<211> 25
<212> PRT
<213> Artificial Sequence
```

<220>
<223> Linker used to create a version of B9E9 scFvSA in

the VHVL orientation

<400> 11
 Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
 1 5 10 15
 Gly Gly Gly Ser Gly Gly Gly Gly Ser
 20 25

<210> 12
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 12
 tgccgtgaat tcgtsmarct gcagsartcw gg 32

<210> 13
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 13
 tgccgtgaat tccattswgc tgaccartct c 31

<210> 14
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 14
 tagctggcgg ccgccctgtt gaagctcttg acaat 35

<210> 15
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 15
 tagctggcgg ccgctttctt gtccaccttg gtgc 34

<210> 16
 <211> 47

<212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 16
 ttacggccat ggctgacatc gtgctgcagt ctccagcaat cctgtct 47

 <210> 17
 <211> 32
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 17
 caccagagat cttcagctcc agcttgggtcc ca 32

 <210> 18
 <211> 52
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 18
 cggaggctcg agccagggttc agctgggtcca gtcaggggct gagctgggtga ag 52

 <210> 19
 <211> 38
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 19
 gagccagagc tcacggtgac cgtgggtccct gcgccccca 38

 <210> 20
 <211> 58
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 20
 gatctctggt ctggaaggca gcccggaagc aggtctgtct ccggacgcag gttccggc 58

 <210> 21

<211> 58
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 21
 tcgagccgga acctgcgtcc ggagacagac ctgcttccgg gctgccttcc agaccaga 58

 <210> 22
 <211> 50
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 22
 ttacggccat ggctgacatc gtgctgtcgc agtctccagc aatcctgtct 50

 <210> 23
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 23
 ttccggctcg agcgacatcg tgctgtcgca gtctcca 37

 <210> 24
 <211> 32
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 24
 gagccagagc tcttcagctc cagcttggtc cc 32

 <210> 25
 <211> 35
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligonucleotide primer

 <400> 25
 ttacggccat ggctcaggtt cagctgggtcc agtca 35

<210> 26
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 26
 agaccagaga tcttgctcac ggtgaccgtg gtccc 35

<210> 27
 <211> 79
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 27
 gatctctggt ggcggtggct cgggcggtgg tgggtcgggt gccggcggct cgggtggtgg 60
 tgggtcgggc gccggcggc 79

<210> 28
 <211> 79
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer

<400> 28
 tcgagccgcc gccgcccgc ccaccaccac ccgagccgcc gccacccgc ccaccaccgc 60
 ccgagccacc gccaccaga 79

<210> 29
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Linker sequence

<400> 29
 Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
 1 5 10 15
 Gly Ser

<210> 30
 <211> 35
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Linker sequence

<400> 30

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
 1 5 10 15
 Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
 20 25 30
 Gly Gly Ser
 35

<210> 31

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Linker sequence pKOD2

<400> 31

Gly Leu Glu Gly Ser Pro Glu Ala Gly Leu Ser Pro Asp Ala Gly Ser
 1 5 10 15
 Asp Ser

<210> 32

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 32

acgacggttg ctgcggcggg t

21

<210> 33

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 33

aggctcatta atgatgcggg t

21

<210> 34

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 34
ggatccaagc ttacgatcac ggtcatgaac acg 33

<210> 35
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 35
ctcgagaagc tttaactaaa ttaatacagc gga 33

<210> 36
<211> 783
<212> DNA
<213> Streptomyces avidinii

<400> 36
gaggttcagc tgcagcagtc cggggcagag cttgtggagc caggggcctc agtcaagttg 60
tcctgcacag cttctggctt caacattaaa gacacctata tgcactgggt gaagcagagg 120
cctgaacagg gcctggaatg gattggaagg attgatcctg cgaatggtaa tagtaaatat 180
gtcccgaagt tccagggcaa ggccactata acagcagaca catcctccaa cacagcctac 240
ctgcagctca ccagcctgac atctgaggac actgccgtct attattgtgc tccgtttgggt 300
tactacgtgt ctgactatgc tatggcctac tggggtcagg gaacctcagt caccgtctcc 360
tcaaagatct ctggtggcgg tggctcgggc ggtggtgggt cgggtggcgg cggctcgggt 420
ggtggtgggt cgggcggcgg cggctcgagc gacattgtgc tgaccaatc tccagcttct 480
ttggctgtgt ctcttgggca gagggccact atgtcctgca gagccgggtga aagtgttgat 540
atTTTTggcg ttgggttttt gcaactgtac cagcagaaac caggacagcc accaaaactc 600
ctcatctatc gtgcatccaa cctagaatct gggatccctg tcaggttcag tggcactggg 660
tctaggacag acttcaccct catcattgat cctgtggagg ctgatgatgt tgccacctat 720
tactgtcagc aaactaatga ggatccgtac acgttcggag gggggaccaa gctggaaata 780
aag 783

<210> 37
<211> 786
<212> DNA
<213> Streptomyces avidinii

<400> 37
gaagttcagc tgcagcagtc tggggcagaa cttgtgcgtt caggggcctc agtcaaaatg 60
tcctgcaccg cttctggctt caacattaaa gattactata tgcattgggt gaaacagcgt 120
ccggaacagg gcctggaatg gattggttg attgatccgg aaaatgggtga taccgaatat 180
gccccgaaat tccagggcaa agccacgatg accaccgata cctcctccaa caccgcctac 240
ctgcagctca gcagcctgac ctctgaagat accgccgtct attactgtaa taccctgtgt 300
ctatctacca tgattacgac gcgttgggtt ttcgatgtct ggggcgcagg gaccacggtc 360
accgtctcca agatctctgg tggcgggtggc tcgggcgggtg gtgggtcggg tggcggcggc 420
tcgggtgggtg gtgggtcggg cggcggcggc tcgagcgata ttgtgctgac ccagtctccg 480
gcttctcttaa ccgtatctct gggctctgct gccaccatct catgccgtgc cagcaaaaagt 540
gtcagtgcat ctggctatag ttatatgcat tggtagcaac agcgtccggg tcagccgccg 600
aaactcctca tctatcttgc atccaacct caatctgggtg tcccggcccc tttcagtggtc 660
agtgggtctg ggaccgattt caccctcaac atccatccgg tggagaaga agatgctgca 720

acctattact	gtcagcatag	tcgtgaactt	ccgacgttcg	gtggtggcac	caaactggaa	780
atcaag						786

<210> 38

<211> 771

<212> DNA

<213> *Streptomyces avidinii*

<400> 38

caggtgaagc	tgcagcagtc	aggtccggag	ttgaagaagc	cgggtgagac	cgtcaagatc	60
agctgcaagg	cttctgggta	taccttcacc	gtgtttggta	tgaactgggt	gaagcaggct	120
ccgggcaagg	gtttaaagt	gatgggctgg	attaacacca	aaactgggtga	agcaacctat	180
gttgaagagt	ttaagggctg	ctttgccttc	tctttggaga	cctctgccac	cactgcctat	240
ttgcagatca	acaacctcaa	aaatgaggac	acggctaaat	atttctgtgc	acgttgggac	300
ttctatgatt	acgtggaagc	tatggattac	tggggccaa	ggaccacggt	caccgtctcc	360
aagatctctg	gtggcgggtg	ctcgggcggg	gggtgggtcgg	gtggcggcgg	ctcgggtggg	420
gggtgggtcgg	gcggcggcgg	ctcgagcgat	attgtgatga	cccagctctca	acgtttcatg	480
tccacttcag	taggtgatcg	tgtcagcgtc	acctgcaaag	ccagtcagaa	tgtgggtacg	540
aatgttgctt	ggtatcaaca	gaaaccgggt	caatccccga	aagcactgat	ttactcggca	600
tcctaccgtt	acagtgggtg	cccggatcgc	ttaccggcca	gtgggttctg	gaccgatttc	660
acgtcacca	tcagcaatgt	acagtctgaa	gacttggcgg	agtatttctg	tcacatcaat	720
tacacctatc	cgttattcac	gttcggctcg	gggaccaagt	tggaaatgaa	g	771

<210> 39

<211> 762

<212> DNA

<213> *Streptomyces avidinii*

<400> 39

caggtgaaac	tgcagcagtc	tgggtgcagaa	cttgtgcggt	cagggacctc	agtcaaattg	60
tcctgcaccg	cttctgggct	caacattaaa	gattcctata	tgcattgggt	gcgtcagggt	120
ccggaacagg	gcctggaatg	gattgggttg	attgatccgg	agaatgggtga	tactgaatat	180
gcaccgaagt	tccaggggcaa	agccaccttt	actaccgata	cctcctccaa	caccgcctac	240
ctgcagctca	gcagcctgac	ctctgaagat	actgccgtct	attattgtaa	tgaagggact	300
ccgactggtc	cgtactactt	tgattactgg	gggtcaaggga	ccacggtcac	cgtctccaag	360
atctctgggtg	gcgggtggctc	gggcggtggg	gggtcgggtg	gcggcgggctc	gggtgggtggg	420
gggtcgggcg	gcggcgggctc	gagcgaaaat	gtgctcacc	agtctccggc	aatcatgtct	480
gcatctccgg	gtgagaaaat	caccattacc	tgcagtgcc	gctcaagtgt	aagttacatg	540
cattgggtcc	agcagaaaacc	gggtacttct	ccgaaactct	ggatttatag	cacctccaac	600
ctggcttctg	gtgttccggc	tcgcttcagt	ggcagtgggt	ctgggacctc	ttactctctc	660
accatcagcc	gtatggaagc	tgaagatgct	gccacttatt	actgccagca	acgtagtagt	720
tatccgctca	cgttcgggtg	tggcaccaaa	ctggaactga	ag		762

<210> 40

<211> 765

<212> DNA

<213> *Streptomyces avidinii*

<400> 40

caggtccaac	tacagcagtc	agggggagac	ttagtgaagc	ctggagggtc	cctaaaattc	60
tcctgtgcag	cctctggatt	ccctttcaat	cgctatgcc	tgtcttgggt	tcgccagact	120
ccagagaaga	ggctggagtg	ggtcgcattc	attagtagtg	atggtatcgc	ctactatgca	180
gacagtgtga	agggccgatt	caccatctcc	agagataatg	ccaggaacat	cctgtaccta	240
caaagtga	gtctgaggtc	tgaggacacg	gccatgtatt	actgtgcaag	agttttattac	300

tacggtagta	gttactttga	ctactggggc	caagggacca	cggtcaccgt	gagcaagatc	360
tctgggtggc	gtggctcggg	cgggtggtgg	tcggtggtgg	gcggctcggg	tggtggtggg	420
tcgggctggc	gcggctcggg	cgacatccag	atgactcagt	ctccaaaatt	catgcccaca	480
tcagtaggag	acagggtcag	cgtcacctgc	aaggccagtc	agaatgcggg	tactaatgta	540
gcctggtatc	aacagaaacc	agggcaatct	cctaaagcac	tgatttactc	ggcatcgtct	600
cggaacagt	gagtcctga	tcgcttcaca	ggcagtggtg	ctgggacaga	tttcaactct	660
accatcagca	atgtgcagtc	tgaagacttg	gcagagtatt	tctgtcagca	atataacagc	720
tatcctctgg	tcacgttcgg	tgctgggacc	aagctggaaa	taaag		765

<210> 41

<211> 768

<212> DNA

<213> *Streptomyces avidinii*

<400> 41

cagggttcagt	tgacgcagtc	tgatgctgaa	ttggtgaaac	cgggtgcttc	agtgaaaatt	60
tcttgcaaaag	cttctggcta	caccttcacc	gatcatgcaa	ttcattgggt	gaaacagaac	120
cgggaacagg	gcctggaatg	gattgggtat	ttctctccgg	gtaatgatga	tttcaaatac	180
aatgaacgtt	tcaaaggcaa	agccacgctg	accgcagata	aatcctccag	caccgcctac	240
gtgcagctca	acagcctgac	gtctgaagat	tctgcagtgt	atttctgtac	gcgttccttg	300
aatatggcct	actggggcca	aggtacctca	gtcaccgtct	ccaagatctc	tggtggcggg	360
ggctcggggc	gtgggtgggt	gggtggcgcc	ggctcgggtg	gtgggtgggt	gggcggcgcc	420
ggctcgagcg	atattgtgat	gtcacagtct	ccgtcctccc	taccgggtgc	agttggcgaa	480
aaagttacct	tgagctgcaa	atccagtcag	agccttttat	atagtggtaa	tcagaaaaac	540
tacttggcct	ggtaccagca	gaaaccgggt	cagtctccga	aactgctgat	ttactgggca	600
tccgctcgtg	aatctggggg	cccggatcgc	ttcaccggca	gtggttctgg	gaccgatttc	660
accctctcca	tcagcagtg	gaaaaccgaa	gacctggcag	tttattactg	tcagcagtat	720
tatagctatc	cgctcacgtt	cgggtgctgg	accaaactgg	tgctgaag		768

<210> 42

<211> 765

<212> DNA

<213> *Streptomyces avidinii*

<400> 42

gaagtgaaac	ttgaagagtc	tggtggtggc	ttggtgcaac	cgggtggctc	catgaaactc	60
tcttgtgctg	cttctggctt	cacctttagt	gatgcctgga	tggattgggt	ccgccagtct	120
ccggagaaaag	ggcttgaatg	ggttgctgaa	attcgtaaca	aagccaataa	tcatggtacc	180
tattatgatg	agtctgtgaa	agggcgcttc	accatctcac	gtgatgattc	caaaagtcgt	240
gtgtacctgc	aaatgattag	cttacgtgct	gaagataccg	ggctttatta	ctgtaccggg	300
gaatttgcta	actggggcca	ggggacgctg	gtcaccgtct	ctaagatctc	tggtggcggg	360
ggctcggggc	gtgggtgggt	gggtggcgcc	ggctcgggtg	gtgggtgggt	gggcggcgcc	420
ggctcgagcg	atgttgtgat	gacccaaact	ccgctctccc	tgccgggtcac	tcttgggtgat	480
caagcttcca	tctcttgccg	ttctagtcat	aaccttgtac	ataacaatgg	taacacctat	540
ttatattggg	tctgcagaaa	atcaggccag	tctccgaaac	tgctgattta	tcgcgcattc	600
atccgctttt	ctggtgtccc	ggatcgcttc	agtggcagtg	gttcagaaac	cgatttcacg	660
ctcaagatca	gccgtgtgga	agctgaagac	ctgggtgttt	atttctgctt	tcaaggtacg	720
catgttccgt	ggacgttcgg	tggtggcacc	aaactggaaa	tcaag		765

<210> 43

<211> 741

<212> DNA

<213> *Streptomyces avidinii*

<400> 43

caggtgcagc	ttcaggagtc	aggacctggc	cttgtgaaac	cctcacagtc	actctccctc	60
acctgttccg	tcactgggta	ctccatcact	actgattact	ggggctggat	ccggaagttc	120
ccaggaaata	aaatggagtg	gatgggatac	ataagctaca	gtggtagcac	tggctacaac	180
ccatctctca	aaagtcgaat	ctccattact	agagacacat	cgaagagtca	gttcttcctg	240
cagttgaact	ctgtaactac	tgaggacaca	gccacatatt	actgtgcaag	atacagtagc	300
cttgattact	ggggccgagg	agtcatggtc	gcagtcctcca	agatctctgg	tggcgggtggc	360
tcgggcggtg	gtgggtcggg	tggcggcggc	tcgggtgggtg	gtgggtcggg	cggcggcggc	420
tcgagcgatg	ttgtgatgac	ccagacacca	ccgtctttgt	cggttgccat	tggacaatca	480
gtctccatct	cttgcaagtc	aagtcagagc	ctcgtatata	gtgatggaaa	gacatatttg	540
cattggttat	tacagagtcc	tggcaggtct	ccgaagcgcc	taatctatca	ggtgtctaata	600
ctgggctctg	gagtccttga	caggttcagt	ggcactggat	cacagaaaga	ttttacactt	660
aaaatcagca	gagtgagggc	tgaggatttg	ggagtttact	actgcgcgca	aactacacat	720
tttctctca	cgttcgggtc	g				741

<210> 44

<211> 765

<212> DNA

<213> Streptomyces avidinii

<400> 44

caggttcagc	tggtccagtc	aggggctgag	ctgggtgaagc	ctggggcctc	agtgaagatg	60
tcctgcaagg	cttctggcta	cacattttacc	agttacaata	tgactgggt	aaagcagaca	120
cctggacagg	gcctggaatg	gattggagct	atztatccag	gaaatgggtga	tacttcctac	180
aatcagaagt	tcaaaggcaa	ggccacattg	actgcagaca	aatcctccag	cacagcctac	240
atgcagctca	gcagcctgac	atctgaggac	tctgcggtct	attactgtgc	aagagcgcaa	300
ttacgaccta	actactggta	cttcgatgtc	tggggcgagc	ggaccacggg	caccgtgagc	360
aagatctctg	gtggcggttg	ctcgggcggg	ggtgggtcgg	gtggcggcgg	ctcgggtggt	420
ggtgggtcgg	gcggcggcgg	ctcgagcgac	atcgtgctgt	cgcagtctcc	agcaatcctg	480
tctgcatctc	caggggagaa	ggtcacaatg	acttgcaggg	ccagctcaag	tgtaagttac	540
atgcactggt	accagcagaa	gccaggatcc	tccccaaac	cctggattta	tgccacatcc	600
aacctggctt	ctggagtccc	tgctcgcttc	agtggcagtg	ggtctgggac	ctcttactct	660
ctcacaatca	gcagagtggg	ggctgaagat	gctgccactt	attactgcca	gcagtggatt	720
agtaaccac	ccacgttcgg	tgctgggacc	aagctggagc	tgaag		765

<210> 45

<211> 765

<212> DNA

<213> Streptomyces avidinii

<400> 45

caggttcagc	tgcaacagcc	aggggctgag	ctgggtgaagc	ctggggcctc	agtgaagatg	60
tcctgcaagg	cttctggcta	cacattttacc	agttacaata	tgactgggt	aaagcagaca	120
cctggacagg	gcctggaatg	gattggagct	atztatccag	gaaatgggtga	tacttcctac	180
aatcagaagt	tcaaaggcaa	ggccacattg	actgcagaca	aatcctccag	cacagcctac	240
atgcagctca	gcagcctgac	atctgaggac	tctgcggtct	attactgtgc	aagaagcacc	300
tattacggcg	gtgattggta	cttcaacgtc	tggggcgagc	ggaccacggg	caccgtgagc	360
aagatctctg	gtggcggttg	ctcgggcggg	ggtgggtcgg	gtggcggcgg	ctcgggtggt	420
ggtgggtcgg	gcggcggcgg	ctcgagccag	atcgtgctgt	cgcagtctcc	agcaatcctg	480
tctgcatctc	caggggagaa	ggtcacaatg	acttgcaggg	ccagctcaag	tgtaagttac	540
attcactggt	ttcagcagaa	gccaggatcc	tccccaaac	cctggattta	tgccacatcc	600
aacctggctt	ctggagtccc	tgctcgcttc	agtggcagtg	ggtctgggac	ctcttactct	660
ctcacaatca	gcagagtggg	ggctgaagat	gctgccactt	attactgcca	gcagtggacc	720
agtaaccac	ccacgttcgg	tggcgggacc	aagctggaga	tcaag		765

<210> 46
 <211> 780
 <212> DNA
 <213> Streptomyces avidinii

<400> 46
 caggttcagc tgggtggaatc aggaggtggc ctggtgcagc ctggaggatc cctgaaactc 60
 tcctgtgcag cctcaggatt cgatttcagt agatactgga tgagttgggt ccggcaggct 120
 ccagggaaag ggctagaatg gattggagag attaatccaa ctagcagtac gataaaacttt 180
 acgccatctc taaaggataa agtcttcac tccagagaca acgccaacaaa tacgctgtac 240
 ctgcaaata gcaaagtga atccgaggac acagcccttt attactgtgc aagagggaac 300
 tactataggt acggagatgc tatggactac tggggcaag gaacctcagt caccgtgagc 360
 aagatctctg gtggcgggtg ctcgggcggg ggtgggtcgg gtggcggcgg ctcgggtggt 420
 ggtgggtcgg gcggcggcgg ctcgagcgac atcgtgctga ccagtcctcc tgcttcctta 480
 gctgtatctc tgggacagag ggccaccatc tcatgcaggg ccagcaaaaag tgtcagtaca 540
 tctggctata gttatctgca ctggtaccaa cagaaaccag gacagccacc caaactcctc 600
 atctatcttg catccaacct agaattctggg gtccctgcca ggttcagtgg cagtgggtct 660
 gggacagact tcaccctcaa catccatcct gtggaggagg aggatgctgc aacctattac 720
 tgtcagcaca gtagggagct tccattcacg ttcggctcgg ggacaaagt ggaaataaag 780

<210> 47
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Gly Ser linker

<400> 47
 Gly Gly Gly Gly Ser
 1 5